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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,860	07/10/2006	Michele Muccini	MOD3216/P0381US	3415
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EXAMINER SUCH, MATTHEW W				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,860

Applicant(s)

MUCCINI ET AL.

Examiner

MATTHEW W. SUCH

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8, 12-16, 19-22 and 24-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8, 12-16, 19-22 and 24-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12 January 2010
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(c) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 60/458,847, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application as shown. Claims 1-6, 8, 12-16, 19-22 and 24-28 as currently presented are not supported by Application No. 60/458,847 for the following reasons.

Regarding claim 1, the Application No. 60/458,847 does not provide support for the channel being a single thin layer of a single polycrystalline small molecule material, wherein the polycrystalline small molecule material has a crystal grain size. As such, claim 1 and all claims dependent therefrom, including claims 2-6, 8, 12-16, 19-22 and 24-28 are not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 3, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the dielectric layer comprising alumina. As such, claim 3 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 4, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the electron and hole electrodes having at least one different material. As such, claim 4 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 5, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the electron electrode comprising In or Perovskite Manganites. As such, claim 5 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 6, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the hole electrode comprising any of indium tin oxide, Cr, Cu, Fe, Ag, poly(3,4-ethylenedioxythiophene) combined with poly(styrene sulfonate) or Perovskite Manganites. As such, claim 6 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 8, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the channel comprising perylene, terthiophene, quinquethiophene or bora-diazaindacene. As such, claim 8 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 12, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the hole electrode and electron electrode are spaced apart at 5 nm to 5 microns. As such, claim 12 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claims 13 and 14, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the electron electrode and hole electrode having digitated structure comprises a regular repetition of a basic finger structure and details claimed therein. As such, claims 13 and 14 are not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 21, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for a flexible or rigid substrate. As such, claim 21 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 22, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the channel being formed by sublimation and details claimed therein. As such, claim 22 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 24, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the channel being formed by solution processing of a small molecule. As such, claim 24 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 25, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the channel being formed by a

combination of sublimation and solution processing. As such, claim 25 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 26, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the channel being formed by thermal, chemical or physical treatment of pre-deposited organic semiconductors. As such, claim 26 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 27, the Application No. 60/458,847 does not provide support for the subject matter of claim 1 and also does not provide support for the device being manufactured by printing techniques. As such, claim 27 is not accorded benefit of the filing date of the Application No. 60/458,847.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 12 January 2010 is being considered by the examiner.

Drawings / Specification

3. The drawings were received on 12 January 2010. These drawings are accepted. The amendments to the specification were received on 12 January 2010 and are entered.

Claim Objections

4. Claim 3 is objected to because of the following informalities: "polymethylmetacrylate" in Line 3 should read "polymethylmethacrylate". Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-3, 5-6, 8, 12-16, 21-22 and 24-28 are rejected under 35 U.S.C. 102(a) as being anticipated by Hepp (Phys. Rev. Lett., Vol. 91).

a. Regarding claim 1, Hepp teaches an electroluminescent generating device comprising a channel of a single thin layer of a single polycrystalline small molecule material, such as polycrystalline tetracene (see Abstract, Line 2; Figs. 1 and 8), which has a crystal size. The examiner notes that the manner in which the claim is written does not limit the crystal size, but merely states that a size exists. As such, any crystal size meets the claim. The channel is able to carry electrons and holes (see Fig. 8, showing both electrons and holes in the tetracene layer). An electron electrode (see Drain in Figs. 1 and 8, for example) is in contact with the channel and is positioned on the top of a first side of the channel layer (see Fig. 8) or within the channel layer (see Fig. 1), the electron electrode being able to inject electrons into the channel layer. An hole electrode (see Source in Figs. 1 and 8, for example) is in contact with the channel and is positioned on the top of a first side of the channel layer (see Fig. 8) or within the channel layer (see Fig.

1), the hole electrode being able to inject holes into the channel layer. A control electrode (see n-doped Si Gate in Figs. 1 and 8, for example) is positioned on a second side of the channel. Regarding the recitation of "whereby light emission of side electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode and said hole electrode", the manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) See MPEP § 2114. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2114. The recitation of "whereby light emission of side electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode and said hole electrode" does not distinguish the present invention over the prior art of He99 who teaches the structure as claimed and also teaches the very functionality set forth by the claim (see Figs. 1 and 7-8 and associated text).

- b. Regarding claim 2, Hepp teaches that a dielectric layer (SiO₂ Insulator in Figs. 1 and 8, for example) is positioned between the channel and the control electrode.
- c. Regarding claim 3, Hepp teaches that the dielectric layer comprises silicon oxide (SiO₂ Insulator in Figs. 1 and 8, for example; Page 1, Right Col., Lines 3-4).d
- d. Regarding claim 5, Hepp teaches that the electron electrode comprises Au (see Figs. 1 and 8 and associated text).
- e. Regarding claim 6, Hepp teaches that the hole electrode comprises Au (see Figs. 1 and 8 and associated text).
- f. Regarding claim 8, Hepp teaches that the channel comprises tetracene (see Abstract, Line 2; Figs. 1 and 8).
- g. Regarding claim 12, Hepp teaches that the hole electrode and the electron electrode are spaced apart by 5 microns (see Fig. 1 and Page 1, Right Col., Lines 9-10).
- h. Regarding claim 13, Hepp teaches that the electron and hole electrodes being digitated structures with regular repetition of a basic finger structure with the electron and hole electrodes alternating each other with two characteristic in-plane distances P and R therebetween being equal (see Fig. 1 and associated text).

- i. Regarding claim 14, Hepp teaches that "P" and "R" are equal at 5 microns (see Fig. 1 and Page 1, Right Col., Lines 9-10).
- j. Regarding claim 15, Hepp teaches that the control electrode is an injection control electrode, since it is a gate electrode, and is positioned on the second side of the channel. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. The recitation of "whereby the application of an electrical potential difference between said control electrode and said hole electrode or electron electrode, facilitates the injection of charge carriers into said channel" does not distinguish the present invention over the prior art of Hepp who teaches the structure as claimed, as well as such functionality.
- k. Regarding claim 16, Hepp teaches that the control electrode is an injection control electrode, since it is a gate electrode, and is positioned on the second side of the channel. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to

patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. The recitation of "whereby the application of an electrical potential difference between said control electrode and said electron and/or hole electrode allows to control the current of at least one type of charge carriers" does not distinguish the present invention over the prior art of Hepp who teaches the structure as claimed, as well as such functionality.

l. Regarding claim 21, Hepp teaches a rigid substrate of a silicon wafer (see Page 1, Right Col., Line 2).

m. Regarding claims 22 and 24-27, the entirety of the language of these claims are directed towards the process of making the electroluminescence generating device of claim 1. It is well settled that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a

"product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. The above case law further makes clear that applicant has the burden of showing that the method language necessarily produces a structural difference. As such, the language claims 22 and 24-27 only requires the electroluminescence generating device of claim 1, which does not distinguish the invention from Hepp, who teaches the structure as claimed.

n. Regarding claim 28, Hepp teaches a method for generating electroluminescence using the device of claim 1 by recombination of electrons and hole injected into the channel from the electron electrode and the hole electrode (Figs. 4-8 and associated text).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hepp (Phys. Rev. Lett., Vol. 91) in view of Heeger ('583).

- o. Regarding claim 4, Hepp teaches that the electron electrode and hole electrode both comprise the same material of Cr/Au instead of teaching that the electron electrode and hole electrode comprise different materials.

However, Heeger teaches an electroluminescent transistor with the electron electrode and hole electrode being different materials, such as Ca for the electron electrode (Col. 6, Lines 13-14 and Col. 9, Lines 1-3) and Au for the hole electrode (Col. 6, Lines 11-12; Col. 8, Lines 66-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the electron electrode and hole electrode of Hepp to be different materials as taught by Heeger. One would have been motivated to do so since Heeger teaches that having different materials for each of the electron and hole electrodes allows for efficient injection of electrons and holes, respectively, into the organic semiconductor layer (see Col. 6, Lines 7-23; Col. 8, lines 65-67; Col. 9, Lines 1-3).

- p. Regarding claims 19 and 20, Hepp does not teach optical confinement and waveguiding layers and optical resonating structures and cavities on the first and/or second side of the channel.

However, Heeger teaches an electroluminescent transistor including optical confinement and waveguiding layers and optical resonating structures and cavities on the first and/or second side of the channel (see Col. 2, Lines 64-67; Col. 4, Lines 35-67; Col. 7, Lines 35-62, at least). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the optical confinement and waveguiding

layers and optical resonating structures and cavities on the first and/or second side of the channel as taught by Heeger in the device of Hepp. One would have been motivated to do so since Heeger teaches that these structures improve the light emission efficiency and tighten the emission spectrum into a laser (see Col. 2, Lines 64-67; Col. 4, Lines 35-67; Col. 7, Lines 35-62, at least).

9. Claims 1-6, 8, 15-16, 19-22 and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heeger ('583) in view of Dodabalapur ('208) in view of Hiroshi (WO '608; provided with Office action dated 13 July 2009). The examiner provides Hiroshi ('380) as an English language equivalent for convenience.

q. Regarding claims 1 and 8, Heeger teaches an electroluminescence generating device comprising a channel (see recombination zone in "polymer" and "polymer LEC" in Fig. 1a; Col. 2, Lines 42-45; Col. 6, Lines 7-30) of a single layer of a single small molecule organic semiconductor (Col. 8, Lines 17-19), the channel being able to carry both types of charge carriers, which are electrons and holes (see Fig. 1a; Col. 7, Lines 30-32). An electron electrode (see "source" in Fig. 1a) is in contact with the channel and positioned on top of a first side of the channel layer (see Fig. 1a) and is able to inject electrons into the channel layer. A hole electrode (see "drain" in Fig. 1a) is spaced apart from the electron electrode and is in contact with the channel and positioned on top of the first side within the channel layer (see Fig. 1a) and is able to inject holes into the channel layer. A control electrode (see "gate" in Figs. 1-2) is positioned on a second side of the

channel. Regarding the recitation of "whereby light emission of side electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode and said hole electrode", the manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) See MPEP § 2114. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2114. The recitation of "whereby light emission of side electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode and said hole electrode" does not distinguish the present invention over the prior art of Heeger who teaches the structure as claimed and also teaches the very functionality set forth by the claim (see Fig. 1a and associated text).

Heeger teaches that amorphous small molecule materials can be used as the channel (Col. 8, Lines 17-19) and is silent regarding the small molecule materials being polycrystalline (with a grain size) and is silent on what the small molecule material is.

However, Dodabalapur teaches using polycrystalline small molecule materials, such as α -6T, which is hexathienylene (otherwise known as alpha-sexithiophene), are advantageous over amorphous small molecule materials for channels in organic transistors (see Col. 3, Lines 19-21 and Col. 5, Lines 56-66). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the polycrystalline form of the small molecular materials, such as α -6T, as taught by Dodabalapur in the device of Heeger instead of the amorphous form. One would have been motivated to do so since polycrystalline materials have higher carrier mobility and improved device performance over the amorphous form (see Dodabalapur Col. 5, Lines 56-66). Additionally, one would have been motivated to use α -6T as the small molecule material since Dodabalapur teaches that this material is simple to form into a polycrystalline form and has excellent carrier mobility. Additionally, Hiroshi ('380) evidences that α -6T is an ambipolar light emitting organic semiconductor material (see Para. 0006-0015, for example), further motivating one of ordinary skill to use this material as the light emitting polycrystalline small molecule material.

r. Regarding claim 2, Heeger teaches that a dielectric layer (see "SiO₂" in Fig. 1a) is between the channel and the control electrode.

s. Regarding claim 3, Heeger teaches that the dielectric layer is silicon oxide (Col. 8, Line 38), alumina (Col. 8, Line 40), or polyimide (Col. 8, Lines 42-43).

- t. Regarding claims 4-6, Heeger teaches that the electron electrode and hole electrode are different materials, such as Ca for the electron electrode (Col. 6, Lines 13-14 and Col. 9, Lines 1-3) and Au for the hole electrode (Col. 6, Lines 11-12; Col. 8, Lines 66-67).
- u. Regarding claim 7, Heeger teaches that the channel comprises a small molecule material (Col. 8, Lines 17-19) or a polymer (Col. 8, Lines 2-9, at least)
- v. Regarding claim 15, Heeger teaches that the control electrode is an injection control electrode, since it is a gate electrode, and is positioned on the second side of the channel. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. The recitation of "whereby the application of an electrical potential difference between said control electrode and said hole electrode or electron electrode, facilitates the injection of charge carriers into said channel" does not distinguish the present invention over the prior art of Heeger who teaches the structure as claimed, as well as such functionality.

w. Regarding claim 16, Heeger teaches that the control electrode is an injection control electrode, since it is a gate electrode, and is positioned on the second side of the channel. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. The recitation of "whereby the application of an electrical potential difference between said control electrode and said electron and/or hole electrode allows to control the current of at least one type of charge carriers" does not distinguish the present invention over the prior art of Heeger who teaches the structure as claimed, as well as such functionality.

x. Regarding claims 19 and 20, Heeger teaches that the device includes optical confinement and/or waveguiding layers and optical resonating structures and cavities on the first and/or second side of the channel (see Col. 2, Lines 64-67; Col. 4, Lines 35-67; Col. 7, Lines 35-62, at least).

y. Regarding claim 21, Heeger teaches that the device further comprises a substrate of a rigid material, such as glass (see "glass" in Figs. 1-2), or a flexible material, such as plastic (see Col. 8, Lines 56-58).

z. Regarding claims 22 and 24-27, the entirety of the language of these claims are directed towards the process of making the electroluminescence generating device of claim 1. It is well settled that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. The above case law further makes clear that applicant has the burden of showing that the method language necessarily produces a structural difference. As such, the language claims 22 and 24-27 only requires the electroluminescence generating device of claim 1, which does not distinguish the invention from Heeger, who teaches the structure as claimed.

aa. Regarding claim 28, Heeger teaches a method for generating electroluminescence using the device of claim 1 by recombination of electrons and hole injected into the channel from the electron electrode and the hole electrode (Figs. 1-2 and associated text).

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heeger ('583) in view of Dodabalapur ('208) in view of Hiroshi (WO '608; provided with Office action dated 13 July 2009) as applied to claim 1 above, and further in view of Rogers (Appl. Phys. Lett., Vol. 75; provided with Office action dated 13 July 2009). The examiner provides Hiroshi ('380) as an English language equivalent for convenience.

Heeger in view of Dodabalapur in view of Hiroshi teaches the device of claim 1, but Heeger is silent regarding conventional details such as the separation distance between the electron and hole electrodes.

However, Rogers teaches forming an organic transistor with a separation distance between the electron and hole electrodes (source and drain) of, for example 100 nm or 0.1 microns (see Abstract; Page 1010, Left Col., Lines 28-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the distance between the electron and hole electrodes (source and drain) of Heeger to be small, such as the 100 nm or 0.1 microns of Rogers. One would have been motivated to do so since Rogers teaches that such small distances result in a device with low voltage and high current characteristics (see Abstract; Page 1010, Left Col., Lines 28-33; Page 1012, Right Col., Lines 25-29) making them even suitable for light emission circuitry.

11. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heeger ('583) in view of Dodabalapur ('208) in view of Hiroshi (WO '608; provided with Office action dated 13 July 2009) as applied to claim 1 above, and further in view of Brazis, Jr. ('120). The examiner provides Hiroshi ('380) as an English language equivalent for convenience.

Heeger in view of Dodabalapur in view of Hiroshi teaches the device of claim 1, but Heeger does not teach the specific configuration for the electron and hole electrodes being digitated structures with regular repetition of a basic finger structure with the electron and hole electrodes alternating each other with two characteristic in-plane distances P and R therebetween being equal.

However, Brazis, Jr. teaches an organic semiconductor transistor with an electron electrode (see Element 14 in Fig. 3) and a hole electrode (see Element 15 in Fig. 3) being digitated structures with regular repetition of a basic finger structure with the electron and hole electrodes alternating each other with two characteristic in-plane distances P and R therebetween being equal (see Fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration set forth by Brazis, Jr. for the electron and hole electrodes of Heeger. One would have been motivated to do so since Brazis, Jr. teaches that such a configuration is advantageous because such a configuration allows for wide channel widths over a small area to improve the current handling capabilities of the device (Para. 0010, 0014).

Response to Arguments

12. Applicant's arguments filed 12 January 2010 with respect to the subject matter of the present application having support in Application No. 60/458,847 have been fully considered but they are not persuasive. The Applicant asserts that the teachings of Application No. 60/458,847 sufficiently describes the claimed subject matter fully. No evidence of this is provided and the Applicant does not point out exactly where in Application No. 60/458,847 the deficiencies can

be found. Assertions and arguments are not a substitute for evidence. As such, the claims fail to find support in the Application No. 60/458,847 and priority to this document is not granted.

13. Applicant's arguments with respect to claims 1-6, 8, 12-16, 19-22 and 24-28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- i. Papadimitrakopoulos ('550) teaches forming a single crystal type transistor and light emitter with a oligomeric Zn-bisquinoline chelate, which is capable of light emission;
- ii. Avouris ('422) teaches a carbon nanotube light emitting lateral transistor configuration;
- iii. Horowitz (Opt. Mater., Vol. 9) and Periasamy (Phys. Rev. Lett., Vol. 68) each teach the emission properties of α -6T, demonstrated as particularly useful in lasing applications. The examiner notes that Heeger teaches lasing applications with the organic electroluminescent transistor.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW W. SUCH whose telephone number is (571)272-8895. The examiner can normally be reached on Monday - Friday 9AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kiesha Bryant can be reached on (571) 272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew W. Such/
Examiner, Art Unit 2891